



Food and Agriculture
Organization of the
United Nations



cirad
AGRICULTURAL RESEARCH
FOR DEVELOPMENT

FOOD SYSTEMS AT RISK

NEW TRENDS AND CHALLENGES





FOOD SYSTEMS AT RISK

NEW TRENDS AND CHALLENGES

Sandrine Dury,
Pauline Bendjebbar,
Étienne Hainzelin,
Thierry Giordano
and Nicolas Bricas (Eds)

Published by
the Food and Agriculture Organization of the United Nations
and
Le Centre de Coopération Internationale en Recherche Agronomique pour le Développement
and
the European Commission
Rome, 2019

Citation:

Dury, S., Bendjebbar, P., Hainzelin, E., Giordano, T. and Bricas, N., eds. 2019. *Food Systems at risk: new trends and challenges*. Rome, Montpellier, Brussels, FAO, CIRAD and European Commission. DOI: 10.19182/agritrop/00080

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO), the Centre de coopération internationale en recherche agronomique pour le développement (CIRAD) or the European Commission (EC) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by CIRAD, FAO or EC in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the author(s) and do not necessarily reflect the views or policies of CIRAD, FAO or EC.

ISBN 978-2-87614-751-5 (CIRAD)

ISBN 978-92-5-131732-7 (FAO)

© FAO, 2019



Some rights reserved. This work is made available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo/legalcode>).

Under the terms of this licence, this work may be copied, redistributed and adapted for non-commercial purposes, provided that the work is appropriately cited. In any use of this work, there should be no suggestion that FAO endorses any specific organisation, products or services. The use of the FAO logo is not permitted. If the work is adapted, then it must be licensed under the same or equivalent Creative Commons license. If a translation of this work is created, it must include the following disclaimer along with the required citation: "This translation was not created by the Food and Agriculture Organization of the United Nations (FAO). FAO is not responsible for the content or accuracy of this translation. The original English edition shall be the authoritative edition."

Disputes arising under the licence that cannot be settled amicably will be resolved by mediation and arbitration as described in Article 8 of the licence except as otherwise provided herein. The applicable mediation rules will be the mediation rules of the World Intellectual Property Organization <http://www.wipo.int/amc/en/mediation/rules> and any arbitration will be in accordance with the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL).

Third-party materials. Users wishing to reuse material from this work that is attributed to a third party, such as tables, figures or images, are responsible for determining whether permission is needed for that reuse and for obtaining permission from the copyright holder. The risk of claims resulting from infringement of any third party-owned component in the work rests solely with the user.

Sales, rights and licensing. FAO information products are available on the FAO website (www.fao.org/publications) and can be purchased through publications-sales@fao.org. Requests for commercial use should be submitted via: www.fao.org/contact-us/licence-request. Queries regarding rights and licensing should be submitted to: copyright@fao.org

CHAPTER 1.3

MAJOR TRENDS IN FOOD SYSTEM DRIVERS

Pauline Bendjebbar¹ and Nicolas Bricas¹

SUMMARY

This chapter explores the trends in major external drivers that will probably present major challenges and raise risks for food systems in the world over the next 20 years. This chapter focuses on only three main categories of trends because they are the easiest to predict and the least uncertain: environmental, demographic and socio-economic. This chapter describes some of the major trends for which we have some data available, although they are still debated by scientists. It will show how Low-Income (LI) and Lower Middle-Income (LMI) countries will experience some of the major challenges.

Demographic trends

A fast-growing population in some countries. Based on the United Nations Population database, the world population is expected to increase from 7.7 billion in 2019 to 8.5 billion by 2030 (*cf. Map 2*). By 2050, this growth is expected to be particularly large in Africa, with an increase of 1.3 billion people, and in Asia, up 750 million people (UN, 2017a). The populations of 33 countries are expected to triple between 2017 and 2100. These are mainly LI and LMI countries (FAO, 2017). Africa will experience an increase in the proportion of young people, while Europe and Asia will see their population age (FAO, 2017).

In particular, population growth will be in urban areas. According to UN Population data (2019), urban populations in LI and LMI countries will grow at an annual rate of 3.9 percent and 2.4 percent respectively over the next 10 years. This means a 50 percent increase in the urban population between 2019 and 2030. *Map 3* shows the countries where urban populations will be larger than rural populations in 2030.

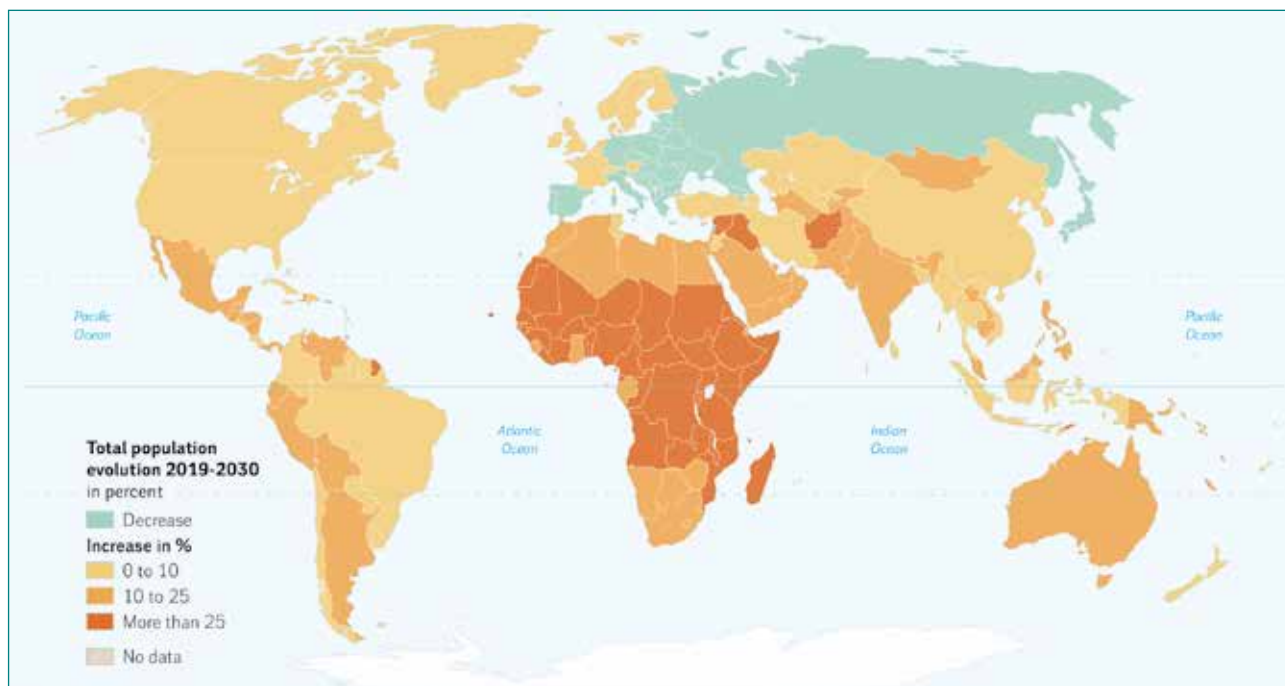
Between 2010 and 2050, the number of cities will grow by 75 percent (*cf. Map 4*). In 2050, 66 percent of the world's population is expected to be urban. The pace of urbanisation is faster in LI and LMI countries than in the rest of the world. Some 56 percent of the population in Africa and 64 percent in Asia will be living in cities in 2050 (HLPE, 2017). India, China and Nigeria are predicted to account for 37 percent of the projected growth in the world's urban population between 2014 and 2050.

The population will also grow in rural areas in some countries. Again referring to UN Population data (2019), urbanisation should not mask the major increase in rural populations in some countries (*cf. Map 5*) and in particular in sub-Saharan African countries. Between 2019 and 2030, the rural population will increase by more than 20 percent in some of these countries. Rural population growth means there will be a quantitative increase in food demand and a need to create jobs in rural areas (UN, 2017a).

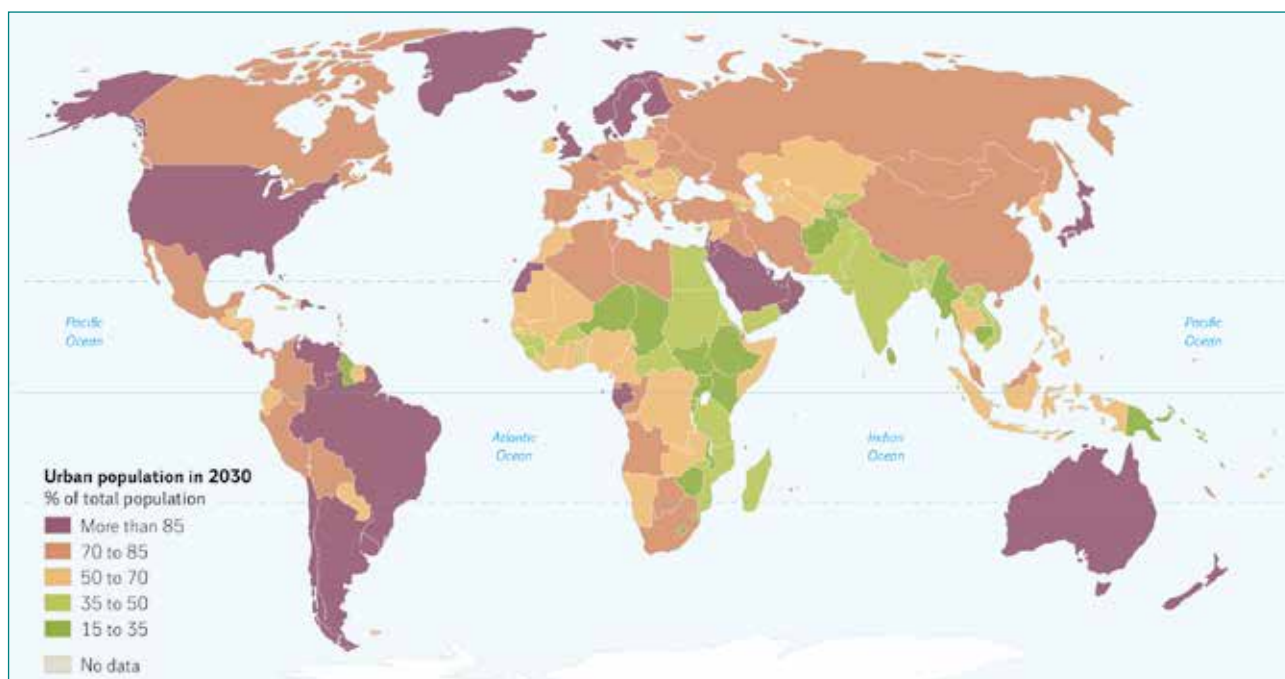
Migration and forced displacement are increasing both internally and internationally. In 2017, there were 30.6 million new internal displacements driven by conflicts and disasters across 143 countries and territories (IDMC, 2018). Natural disasters remain the main cause of population displacements at the global level, but conflicts are the main cause in Africa (*cf. Map 6*) (IDMC, 2018).

The projected growing impact of global warming will certainly increase disaster-related displacements and potentially fuel social unrest and conflicts as populations migrate in the search for new land, water and food.

1. CIRAD, UMR MOISA, F-34398 Montpellier, France;
University of Montpellier, F-34090 Montpellier, France.



Map 2: Total population evolution from 2019 to 2030 (in %).
 Data source: UN Population database 2019.

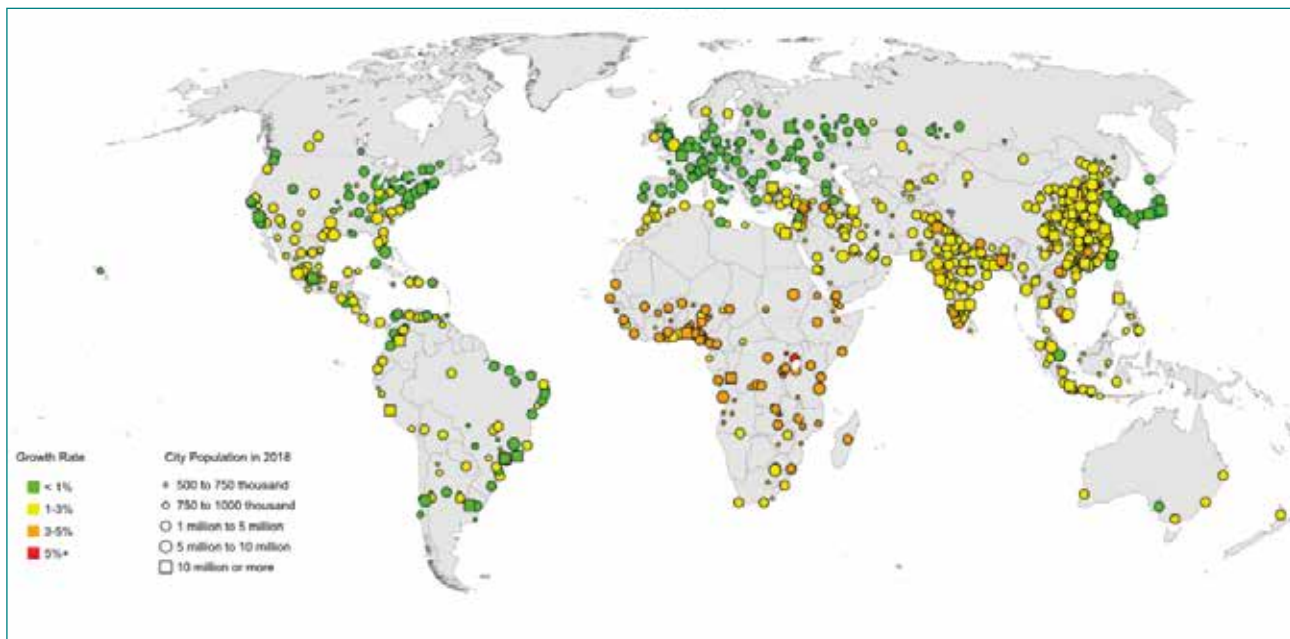


Map 3: Projected share of urban populations in 2030 (in %).
 Data source: UN Population database 2019.

International migrations are also increasing in some parts of the world, mainly motivated by the search for a better life and employment (UNHCR, 2018). International migrants move primarily between developing countries and often within the same region. Migration flows from Asia totalled more than 30 million people between 2010 and 2015, out of which only 4 million migrated to Northern America

and 4 million to Europe. Migration flows from the African continent totalled 10 million people between 2010 and 2015, out of which only 2 million migrated to Europe (*cf.* Figure 4).

In general, food systems which are unsteady due to low food production capacities, low resilience, high pressure on resources and political insecurity generate more migrations and displacements.



Map 4: Cities in 2018 and their growth rate 2018-30.
Source: UN World Urbanization Prospects; The 2018 Revision.

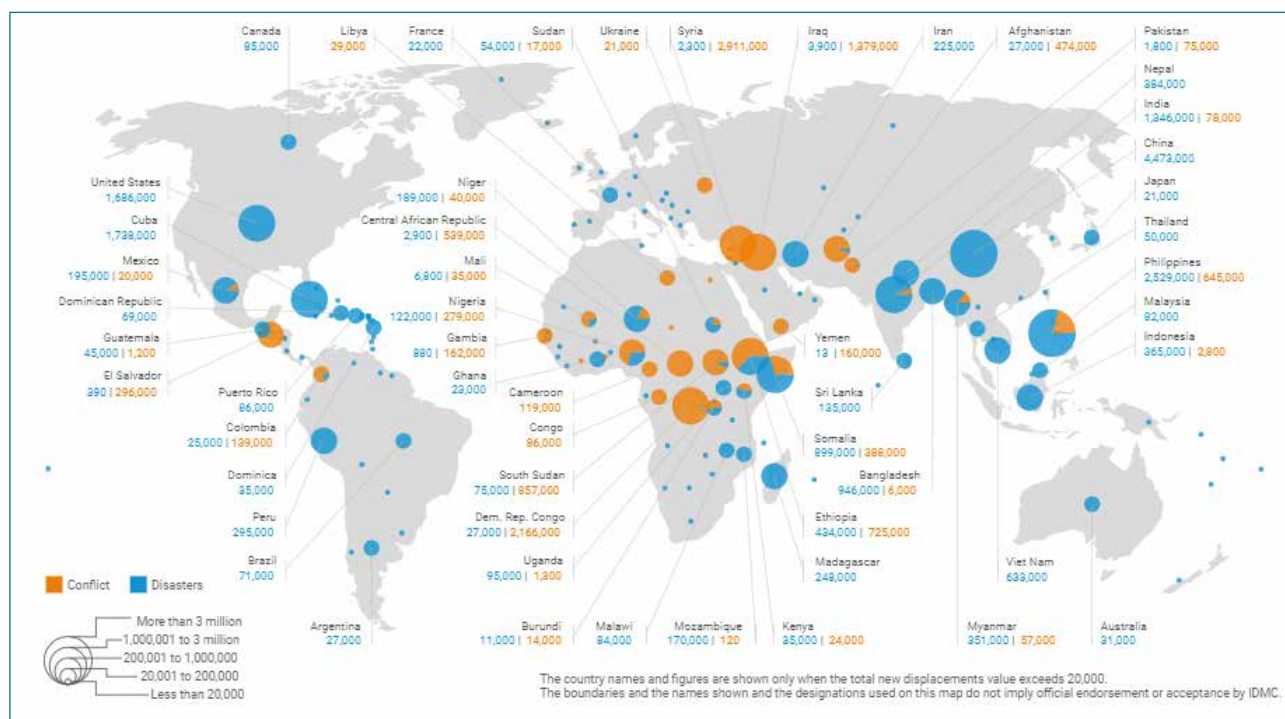


Map 5: Expected rural population growth from 2019 to 2030 in %.
Data source: UN Population database 2019.

Major environmental trends

Major environmental trends show that humanity is facing an alarming situation. This was already apparent in 1992 when 1,700 independent members of the Union of Concerned Scientists joined together for the 'World Scientists' Warning to Humanity'. Many

researchers came together again in 2017 to reiterate the warning about potential irreversible damage to the planet. This damage concerned "ozone depletion, freshwater availability, marine life depletion, ocean dead zones, forest loss, biodiversity destruction, climate change, and continued human population growth" (Ripple *et al.*, 2017) (*cf.* Figure 5).



Map 6: New internal population displacement by conflict and disaster in 2017.
 Source: IDMC 2018.

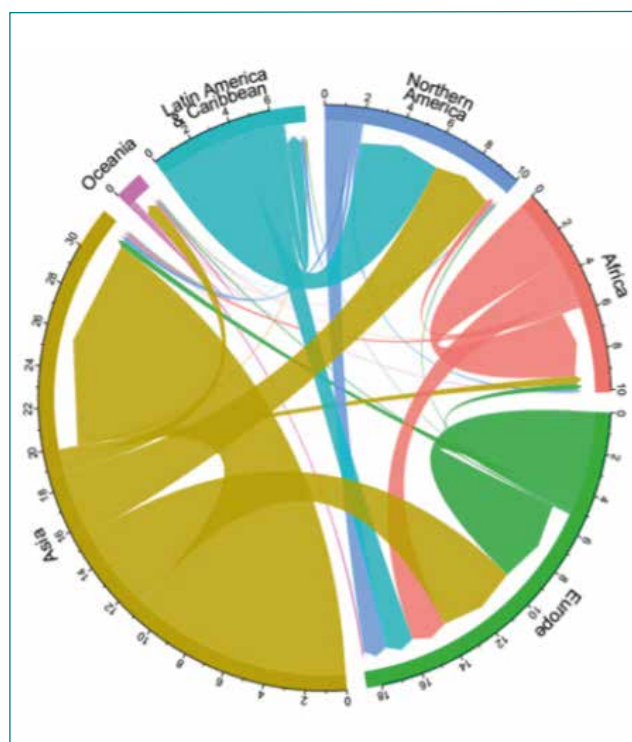


Figure 4: Estimated regional migration flows, 2010-2015.
 Source: IOM, 2018 from UN DESA, 2015.

Datasets for the 2015 revision of international migration flows to and from selected countries available. The direction of the flow is indicated by the arrowhead. The size of the flow is determined by the width of the arrow at its base. Numbers on the outer section axis, used to read the size of migration flows, are in millions. So, for example, between 2010 and 2015, there was an increase of around 4 million people in Northern America who were born in Asia.

As the [figure 5](#) illustrates, many environmental indicators show that we are not yet changing trends towards more sustainable systems, which includes food systems. Indeed, all these trends affect food systems in all parts of the world.

Socio-economic trends

One major trend is the evolution in incomes since this is driving food diets. A middle class is emerging in Asia, Near East and North Africa and in sub-Saharan Africa. Growth in the middle class is stagnating in Europe (from 724 million in 2015 to a predicted 733 million in 2030), North America (from 335 million in 2015 to a predicted 354 million in 2030) and Central and South America (from 285 million in 2015 to a predicted 335 million in 2030) (*cf.* [Figure 6](#)).

Poverty and within-country inequalities remain high. ILO projections of the distribution of employment by economic level from 2019 to 2023 in LI countries show that despite an increase in the middle class, moderately and extremely poor income levels will remain the largest category of employment in these countries (near poor, moderately poor and extremely poor combined, in yellow, orange and red on the graph). This share seems set to remain the largest based on the predictions (*cf.* [Figure 7](#)).

Poor populations are much more vulnerable to shocks. After a shock, they may have difficulties in accessing adequate food, especially in urban areas.

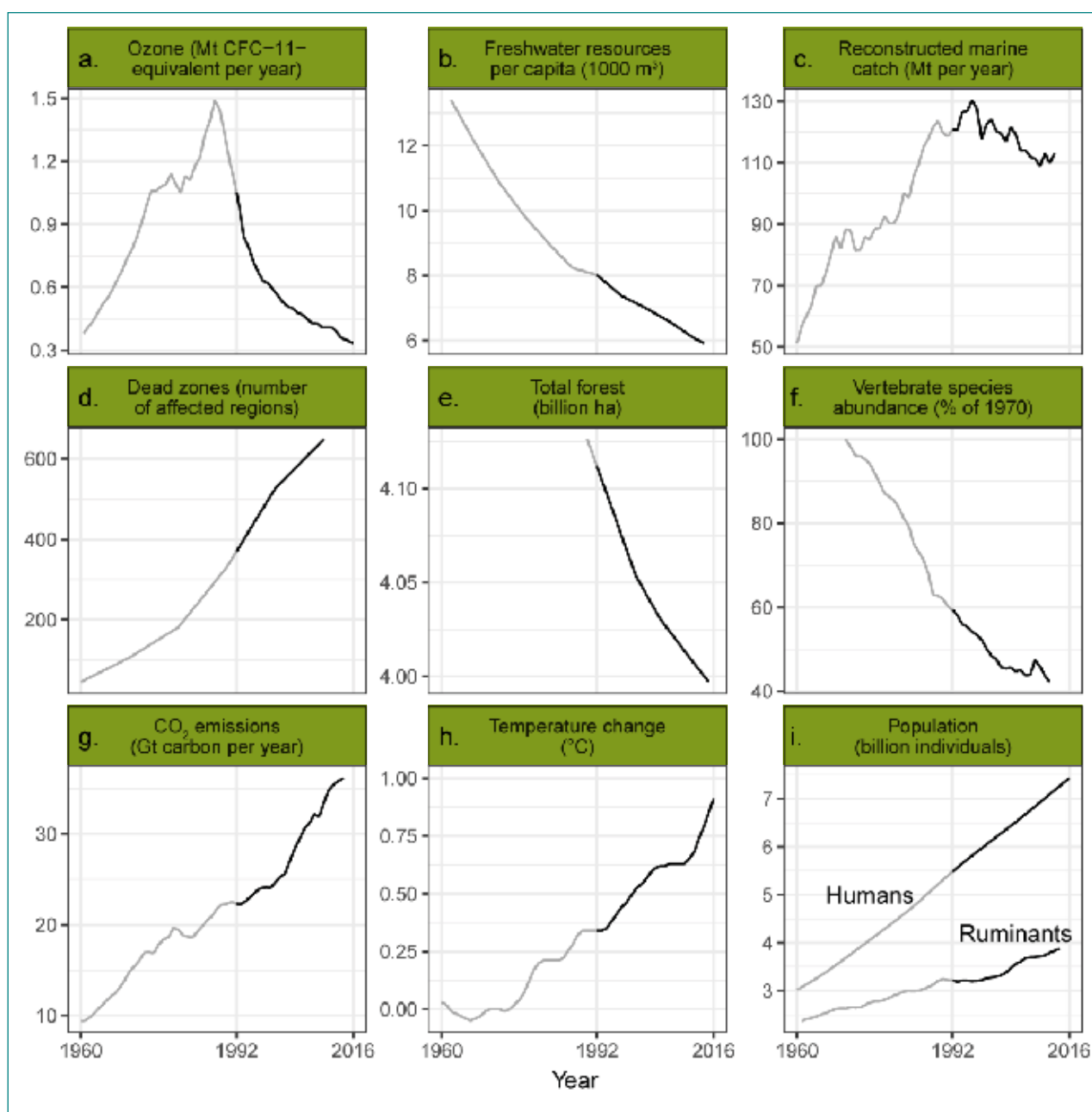


Figure 5: Trends over time, environmental issues identified in the 1992 scientists' warning to humanity. Source: Ripple et al., 2018.

The years before and after the 1992 scientists' warning are shown as grey and black lines respectively. Panel (a) shows emissions of halogen source gases, which deplete stratospheric ozone, assuming a constant natural emission rate of 0.11 Mt CFC-11-equivalent per year. In panel (c), marine catch has been falling since the mid-1990s, but at the same time, fishing efforts have increased (supplemental file S1). The vertebrate abundance index in panel (f) has been adjusted for taxonomic and geographic bias but incorporates relatively little data from developing countries, where there are the fewest studies; between 1970 and 2012, vertebrates fell by 58 percent, with freshwater, marine, and terrestrial populations decreasing by 81 percent, 36 percent and 35 percent respectively (file S1). Five-year means are shown in panel (h). In panel (i), ruminant livestock consists of domestic cattle, sheep, goats and buffaloes. Note that y axes do not start at zero and it is important to inspect the data range when interpreting each graph. Percentage change, since 1992, for the variables in each panel are as follows: (a) -68.1 percent; (b) -26.1 percent; (c) -6.4 percent; (d) +75.3 percent; (e) -2.8 percent; (f) -28.9 percent; (g) +62.1 percent; (h) +167.6 percent; and (i) humans: +35.5 percent, ruminant livestock: +20.5 percent.

Food production per capita has never been higher. Food production has increased faster than population growth, even in those regions undergoing rapid demographic growth such as Africa (cf. Figure 8). As a result, food insecurity has improved but remains high despite food production that currently exceeds

average caloric needs at the global level and should remain so. However, a turning point was reached in 2015 (cf. Figure 9). Many reasons explain this reverse and many more might threaten food security in LI and LMI countries in the decades to come.

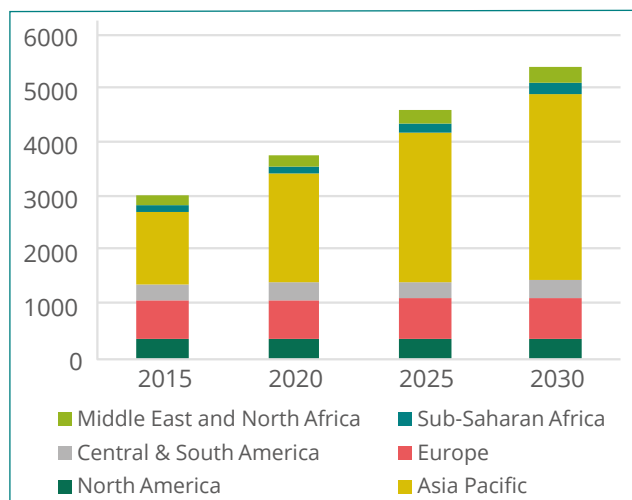


Figure 6: The expansion of the global middle class (in millions).
 Source: Kharas, 2017.

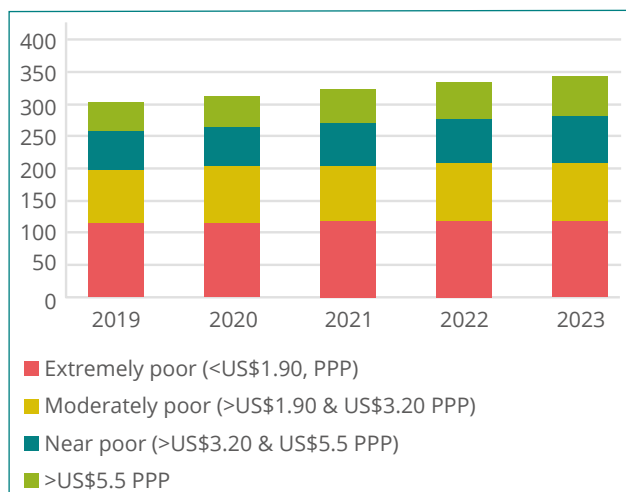


Figure 7: Distribution of employment by economic level in Low-Income countries (in millions). Source: ILOSTAT, 2019.

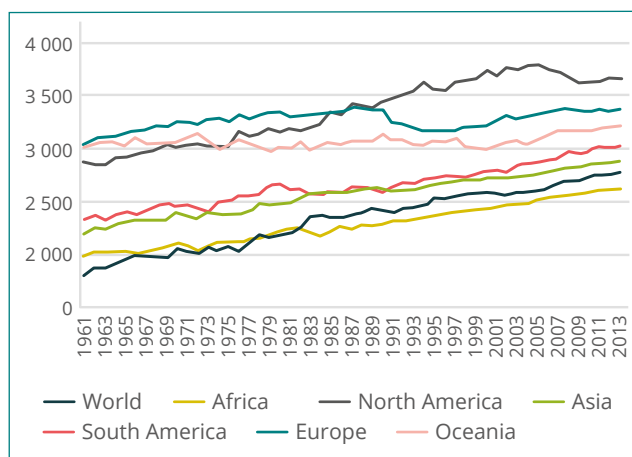


Figure 8: Dietary energy supply in kcal/cap/day.
 Source: FAOSTAT, 2019.

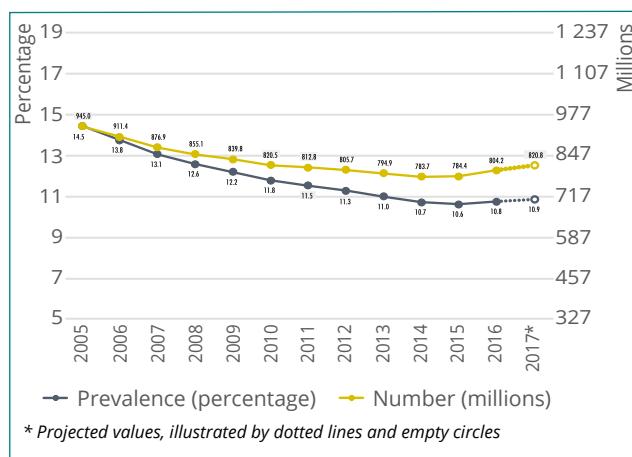


Figure 9: Undernourishment.
 Data source: FAO, 2018.

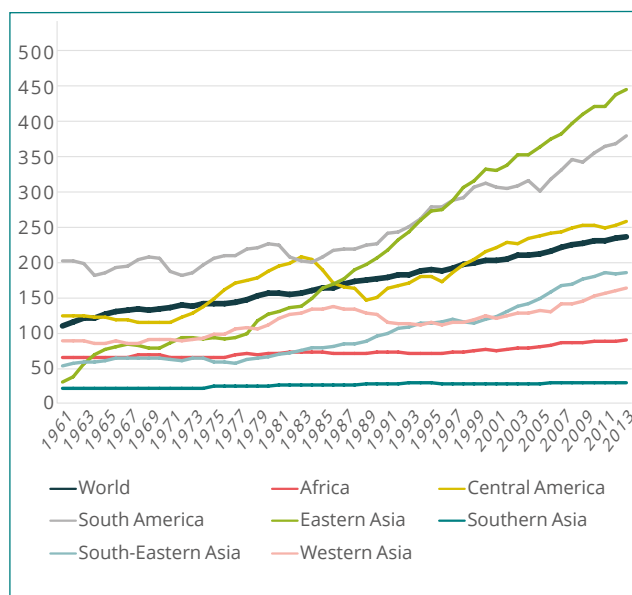


Figure 10: Meat availability in kcal/cap/day.
 Source: FAOSTAT, 2019.

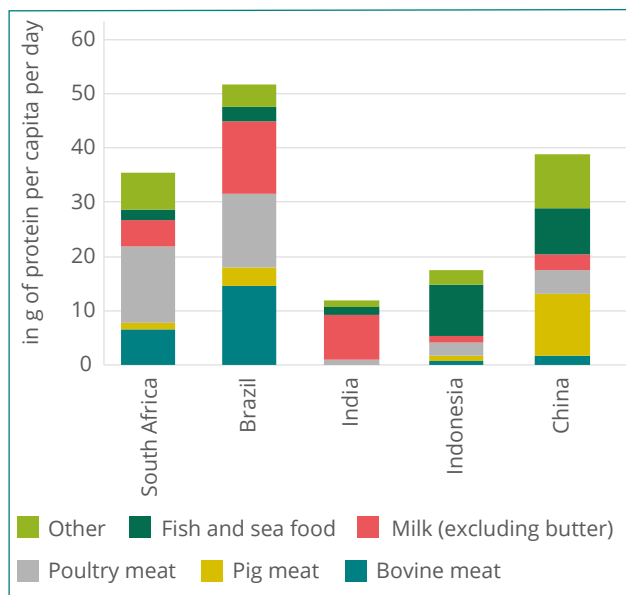


Figure 11: Structure of animal product availability in selected countries in 2011-13.
 Source: FAOSTAT, 2019

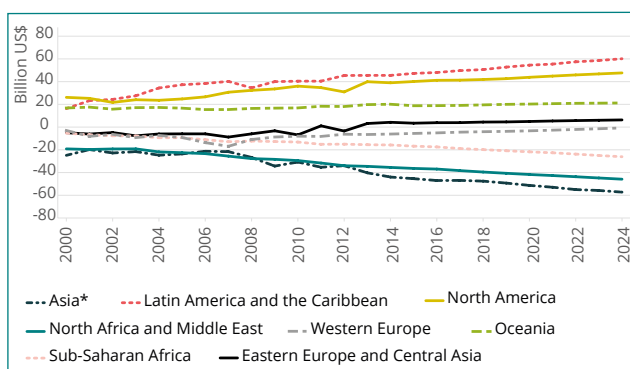


Figure 12: Evolution of net trade in agricultural products by region, 2000-24 (in billion US\$).

Source: OECD-FAO Agricultural Outlook 2015–2024 cited in FAO, 2015.

Notes: Net exports of cereals, oilseeds, sugar crops, meats, fish and dairy products evaluated at 2004–06 constant international reference prices. Data from 2014 onward are projections.

Asia covers all Asia except for Central Asia and includes Southeast Asia, South Asia, and East Asia (including China).

Another major socio-economic trend is changes in food diets around the world. Food diets are evolving towards increased meat consumption. This growth will be particularly important in Eastern Asia (cf. Figure 10).

Although meat availability is increasing all over the world, the diversity of animal products consumed demonstrates the persistence of dietary differences between countries (cf. Figure 11).

More processed food is being consumed around the world due to the increasing industrialisation of food processing (Claquin *et al.*, 2017). This has led to the extensive spread of some highly industrialised and standardised 'global' products, such as sodas and sugar.

Another major trend is the evolution of food markets. National and local market trends show a

commoditisation of agricultural products. In sub-Saharan Africa, for example, part of the food consumed in rural areas is self-produced. Nevertheless, markets have tended to expand everywhere. In Western Africa, around half of the value of food consumption in rural areas comes from markets. Around half of the starch products consumed by rural populations in the 16 countries studied by Bricas, Tchamda and Mouton (2016) are purchased, not self-produced. This proportion is even higher for animal and other products (Bricas, Tchamda and Mouton, 2016). Furthermore, supermarkets continue to spread across the world, with high growth trends in all LI and LMI countries (Reardon *et al.*, 2003).

International trade is expected to increase at the global level. Based on trends between 1995–1996 and 2012–2013, transcontinental trade has increased, with more exchanges between Asia and Pacific countries (Claquin *et al.*, 2017). Processed products will increase their share in the world market, while products historically traded internationally, such as cocoa and coffee, will remain so (Claquin *et al.*, 2017). In Least Developed countries (LDC), between 2001–04 and 2009–12 the share of raw commodities in the total value of agricultural exports increased from 37.8 to 48.5 percent (cf. Figure 12) (FAO, 2015). However, the share of processed products in LDC agricultural exports shrank "from 31 to 26 percent" (cf. Figure 12) (FAO, 2015).

Conclusion

This description of some of the major trends is not exhaustive. We have chosen to focus on trends that may pose major risks for the future of food systems. These trends highlight the fact that LI and LMI countries might be the most vulnerable regions in the world. The following chapters and sections explore these trends in more detail and examine their consequences for food systems in LI and LMI countries. ●

References

- Bricas, N., Tchamda, C. & Mouton, F., eds. 2016. *L'Afrique à la conquête de son marché alimentaire intérieur. Enseignements de dix ans d'enquêtes auprès des ménages d'Afrique de l'Ouest, au Cameroun et du Tchad*. Études de l'AFD 12, Paris, AFD.
- Claquin, P., Martin, A., Deram, C., Bidaud, F., Delgoulet, E., Gassie, J. & Hérault, B. 2017. *MOND'Alim 2030, panorama prospectif de la mondialisation des systèmes alimentaires*. Paris, La Documentation française.
- FAO. 2017. *The future of food and agriculture – Trends and challenges*. Rome. 166 pp.
- FAO. 2018. *The State of Food Security and Nutrition in the World 2018*. [online] <http://www.fao.org/3/ca5162en/ca5162en.pdf>

- Internal displacement monitoring centre (IDMC). 2018. *Global report on internal displacement*. GRID. (also available at www.internal-displacement.org/global-report/grid2018/downloads/2018-GRID.pdf).
- International Organization for Migration. 2018. *World Migration Report 2018*. [online] https://publications.iom.int/system/files/pdf/wmr_2018_en.pdf.
- Kharas, H. 2017. *The unprecedented expansion of the global middle class: an update*. Global Economy & Development working paper 100. Washington, DC, Brookings.
- Reardon, T., Timmer, C.P., Barrett, C.B. & Berdegue, J. 2003. The rise of supermarkets in Africa, Asia, and Latin America. *American journal of agricultural economics*, 85(5): 1140–1146.

Ripple, W.J., Wolf, C., Newsome, T.M., Galetti, M., Alamgir, M., Crist, E., Mahmoud, M.I. *et al.* 2017. World scientists' warning to humanity: a second notice. *BioScience*, 67(12):1026–1028 [online]. <https://doi.org/10.1093/biosci/bix125>

UNHCR. 2018. *Global trends. Forced displacements in 2017*. Geneva, UN. (also available at <https://www.unhcr.org/5b27be547.pdf>)<https://www.unhcr.org/5b27be547.pdf>

United Nations. 2017. *World population prospects: the 2017 revision, key findings and advance tables*. Working Paper ESA/P/WP/248. New York, UN.